Context-Aware Support for Communities of Practice

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Abstract

This poster concerns the need for software engineering support in providing Context-Aware solutions for Communities of Practice (CoP). We illustrate the use of an agent-oriented modeling language (AORML) for analyzing the contextual information and interactions between participating actors in a context-aware services platform. AORML is a UML-based language specifically tailored for agent-oriented systems analysis and design, and it has already been illustrated in previous work related to Distributed Knowledge Management. The chosen supporting platform is the WASP Platform (Web Architectures for Services Platforms), a Web services-based context-aware platform that runs on top of 3G networks.

1 Introduction

In this work, we discuss a context-aware approach for supporting Communities of Practice (CoPs). CoPs are today an established concept in the Knowledge Management theory, and have also been applied in practice in many organizational settings [Guizzardi et al, 2004]. Moreover, Context-Aware computing deals with the ability of computer systems to take advantage of information from or the conditions in the user's dynamic environment to provide services or to execute tasks. In section 2, we exemplify the use of Agent-Object-Relationship Modeling language in the analysis of a specific context, given by a fictitious scenario, inspired in the available literature regarding health care systems and ubiquitous computing [Konstantas, 2004]. The example uses WASP platform as the supporting context-aware services platform. Finally, section 3 concludes this poster.

2 Context-Aware modeling using AORML in WASP platform

The WASP project [Costa, 2003] is concerned with the definition and validation of a services platform to facili-

tate the development and deployment of context-aware applications on top of 3G networks using Web Services infrastructures. The platform allows client application to subscribe to services made available in the platform by Service Providers that use contextual information provided by Context Providers. This feature brings flexibility since services can be offered without having to change the platform, and contextual information can be programmatically added through an API. This is the main reason why we chose to use the WASP Platform in the work described here. The main components of the WASP platform are: (i) Context Interpreter that gathers contextual information from Context Providers, manipulates the contextual information and makes it uniformly available to the platform; (ii) Monitor, responsible for interpreting and managing client application's subscriptions; and (iii) Service Manager that provides semantic service-oriented capabilities to the platform such as service description publishing, service discover and selection, service composition and service execution.

The following scenario description uses this platform: "The ABC hospital management supports the Distributed Knowledge Management approach, sponsoring the development of Communities of Practice (CoPs) across the hospital units. These communities are self-organizing groups whose members share interests and goals, or perform similar tasks within the hospital. Thus, their members are not necessarily from the same working team or unit. In this setting, new communities naturally emerge, and the management fostered their initial configuration as follows: i) first, the CoPs have been organized reflecting the division of medical specialties, e.g., cardiology, neurology, among others; and then, ii) an extension of the WASP context-aware services platform began supporting the emergence of new CoPs, based on interactions between members of each unit. Using this new platform, the communities' members fill in their profiles and interact with each other by sending e-mails, submitting comments to newsgroups and using instant messaging. The members' profiles along with the information over their interactions, considered here as contextual information, are analyzed by services available on the platform, which identify related interests, cognitive and social characteristics for creating new CoPs."

2.1 Modeling with AORML

AORML supports context analysis using the AOR external model, which starts with the Agent Diagram. Figure 1 presents an agent diagram, depicting the active entities (agents) of the described scenario. The agents can be artificial, human or institutional agents, as shown in Fig. 1, using UML stereotypes on top of the rounded-box representing each agent. Table 1 summarizes the description of each agent in Fig. 1



Figure 1 - Scenario modeled using AORML Agent Diagram

A concrete example of the proposed platform use is the following: Ronald, a cardio-vascular surgeon exchange emails with Sanny, a plastic surgeon, about the implications of a particular plastic surgery procedure in cardiovascular condition. Although they are from different medical specialties, thus from different initial CoPs, they are married (social characteristic) and share common professional interests. The platform receives some contextual information (e.g., personal data from the users' profiles showing Ronald and Sanny are married) from Context Providers. This contextual information represents the triggering condition necessary for the execution of a service to evaluate the requirements for creating a new CoP that encompasses the involved interests. Other possible artifacts in this setting that support the elicitation of contextual information are: emails between hospital members, from which personal shared interests may be extracted, published CVs from the hospital staff, and medical specialists filled form about special health conditions or patients.

3 Conclusions

In this poster, we presented an AORML model of a particular health care scenario using a context-aware services platform. Due to space limitations, the presentation of our analysis results has been simplified here. For further references for the WASP project and AORML case studies we refer you to the following web sites: http://www.freeband.nl/projecten/wasp/ENindex.html and http://tmitwww.tm.tue.nl/staff/gwagner/AORML/, respectively.

Table 1 –	Agent's	summarized	descriptions
	Agent 5	Summarized	descriptions

Agent	Description		
Hospital	Represents the organization where the		
ABC	CoPs are developed in our scenario All		
TIDe	other agents are placed within this one i e		
	the humans and artificial agents that sun-		
	port <i>CoPs</i> on behalf of the organization		
CoP	Represents the communities of practice		
001	created within and across the units of the		
	Hospital ABC.		
Manage-	Fosters CoPs within the Hospital ABC.		
ment			
Medical	Serve as basis for the creation of the first		
Specialty	CoPs.		
Member	The participants of the CoPs and also the		
	actual users of the WASP Platform. The		
	information about their interests, cognitive		
	and social characteristics composes their		
	profile locally stored in their specific units.		
WASP	Proposed platform to support context-aware		
Platform	services.		
Monitor	WASP internal agent responsible for: a)		
	managing the contextual information re-		
	ceived by the Context Interpreter; b) trig-		
	gering services execution once a triggering		
	condition is matched.		
Context	WASP internal agent that receives contex-		
Inter-	tual information from Context Providers		
preter	and puts this information in the standard		
	WASP format. The input contextual infor-		
	mation may be in various protocols, con-		
	figurable in the WASP Platform.		
Service	Offer their services by registering the ser-		
Provider	vices description to the platform		
Context	Provides contextual information gathered		
Provider	by sensors or third party context providers		

References

[Costa, 2003] P. D. Costa. *Towards a Services Platform for Context-Aware Applications*. Master Thesis, University of Twente, The Netherlands, 2003.

[Guizzardi et al, 2004] R. S. S. Guizzardi, et al. *Knowledge Management Support to Communities of Practice through Agent-Oriented Analysis.* In: Proceedings of the 4th International Conference on Knowledge Management, Graz, Austria, June/2004. [Konstantas, 2004] Usign UMTS in Emergency Health Care, In: Mobile Solutions 2004, The Netherlands, April 2004.